

CLAIMS

What is claimed is:

5 1. An electric solenoid comprising a plurality of components formed of
solenoid-quality stabilized ferritic stainless steel.

10 2. An electric solenoid in accordance with Claim 1 wherein said solenoid-
quality stabilized ferritic stainless steel is a free machining grade.

15 3. An electric solenoid in accordance with Claim 1 wherein at least two of
said plurality of components are adjacent and are joined together by welding.

20 4. An electric solenoid in accordance with Claim 3 wherein said welding is
carried out by laser fusion of said adjacent components.

25 5. A fuel injector assembly comprising a plurality of components formed of
solenoid-quality stabilized ferritic stainless steel.

30 6. A fuel injector in accordance with Claim 5 further comprising an electric
solenoid actuator.

35 7. A fuel injector assembly in accordance with Claim 6 wherein said
solenoid-quality stabilized ferritic stainless steel is a free machining grade.

40 8. A fuel injector assembly in accordance with Claim 7 wherein said free

machine grade solenoid-quality stabilized ferritic stainless steel comprises chip-breaking inclusions.

9. A fuel injector assembly in accordance with Claim 8 wherein said
5 inclusions comprise sulfur and manganese.

10. A fuel injector assembly in accordance with Claim 6 wherein at least
two of said plurality of components are adjacent and are joined together by welding.

10 11. A fuel injector assembly in accordance with Claim 10 wherein said
welding is carried out by laser fusion of said adjacent components.

12. A fuel injector assembly in accordance with Claim 10 wherein said
plurality of components includes an injector body.

15 13. A fuel injector assembly in accordance with Claim 12 wherein said
plurality of components further includes a solenoid body.

20 14. A fuel injector assembly in accordance with Claim 13 further including
a seat assembly formed of a martensitic stainless steel.

25 15. A fuel injector assembly in accordance with Claim 5 wherein said
stabilized ferritic stainless steel comprises, in terms of weight percentage, about 10% to
about 35% chromium and at least one element selected from the group consisting of
titanium and columbium.

16. A fuel injector assembly in accordance with Claim 5 wherein said stabilized ferritic stainless steel components exhibit soft magnetic properties capable of carrying a magnetic flux.

5 17. A fuel injector assembly in accordance with Claim 5 wherein at least
one of said components is formed of a stabilized ferritic stainless comprising, in terms of
weight percentage, about 12% to about 19% chromium, and at least one element
selected from the group consisting of titanium and columbium, and wherein each of said
at least one element is present at no more than about 1.5 weight percent.

10 18. A fuel injector assembly including an electric solenoid actuator, wherein said assembly comprises a fuel tube formed of an austenitic stainless steel and an injector body formed of a stabilized ferritic stainless steel.

15 19. A fuel injector assembly in accordance with Claim 18 further comprising a coil body formed of stabilized ferritic stainless steel.

20. A method of reducing susceptibility to metallurgical sensitization and
intergranular corrosive attack in solenoid-type fuel injectors having adjacent
20 components joined together by welding, comprising the steps of:

- a) forming at least one of said adjacent components of stabilized ferritic stainless steel, said adjacent components each having a designated bonding surface;
- b) arranging said adjacent components to have corresponding bonding surfaces in contact with each other; and

c) welding said stabilized ferritic stainless steel components together at said bonding surfaces.

21 20. A method in accordance with Claim 19 wherein said welding step is
5 carried out by laser welding.

22 21. A method in accordance with Claim 19 wherein said stabilized ferritic stainless steel is solenoid-quality.

10 23 22. A method in accordance with Claim 21 wherein said stabilized ferritic
stainless steel is a free machining grade.